Lab 05

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Question 1: One sample test for variance

AIM: Here our aim is to find one sample test for variance and Test for equality of variance .Here we use Breast Cancer dataset.

About the dataset Here we use breast cancer dataset. It consists of columns "age", "race"," marital status"," tumor size" etc.

Data Source: I found this "Breast Cancer " dataset from Kaggle.

Introduction: For One sample test for variance we use chi-squared test. And test for equality of variance we used F-test.

Chi-Squared test: A chi-squared test (symbolically represented as χ2) is basically a data analysis on the basis of observations of a random set of variables. Usually, it is a comparison of two statistical data sets. This test was introduced by Karl Pearson in 1900 for categorical data analysis and distribution. So it was mentioned as Pearson's chi-squared test.

F-test: F test is a statistical test that is used in hypothesis testing to check whether the variances of two populations or two samples are equal or not. In an f test, the data follows an f distribution. This test uses the f statistic to compare two variances by dividing them. An f test can either be one-tailed or two-tailed depending upon the parameters of the problem.

```
library(readxl)
Breast_Cancer <- read_excel("C:/Users/PRASANTA/Downloads/Breast_Cancer.xls")
View(Breast_Cancer)

colnames(Breast_Cancer)

##  [1] "Age"                  "Race"                 "Marital Status"
##  [4] "T Stage"              "N Stage"              "6th Stage"
##  [7] "differentiate"        "Grade"                "A Stage"
## [10] "Tumor Size"           "Estrogen Status"      "Progesterone
Status"
## [13] "Regional Node Examined" "Reginol Node Positive"  "Survival Months"
## [16] "Status"

head(Breast_Cancer)

## # A tibble: 6 × 16
##      Age Race  Marital St…¹ T Sta…² N Sta…³ 6th S…⁴ diffe…⁵ Grade A Sta…⁶
Tumor…⁷
```

```
##    <dbl> <chr> <chr>       <chr>   <chr>   <chr>   <chr>   <chr> <chr>
<dbl>
## 1     68 White Married      T1      N1      IIA     Poorly… 3     Region…
4
## 2     50 White Married      T2      N2      IIIA    Modera… 2     Region…
35
## 3     58 White Divorced     T3      N3      IIIC    Modera… 2     Region…
63
## 4     58 White Married      T1      N1      IIA     Poorly… 3     Region…
18
## 5     47 White Married      T2      N1      IIB     Poorly… 3     Region…
41
## 6     51 White Single       T1      N1      IIA     Modera… 2     Region…
20
## # … with 6 more variables: `Estrogen Status` <chr>,
## #   `Progesterone Status` <chr>, `Regional Node Examined` <dbl>,
## #   `Reginol Node Positive` <dbl>, `Survival Months` <dbl>, Status <chr>,
and
## #   abbreviated variable names ¹`Marital Status`, ²`T Stage`, ³`N Stage`,
## #   ⁴`6th Stage`, ⁵differentiate, ⁶`A Stage`, ⁷`Tumor Size`

library('EnvStats')

##
## Attaching package: 'EnvStats'

## The following objects are masked from 'package:stats':
##
##     predict, predict.lm

## The following object is masked from 'package:base':
##
##     print.default

x<-Breast_Cancer$`Tumor Size`
x

##    [1]    4  35  63  18  41  20   8  30 103  32  13  59  35  15  35  19  46
24
##   [19]   25  29  30  40  29  70  20  22  50  17  25  21  40  15  15  20  30
10
##   [37]   27  18  35  23  70  17  21  23   5  51   9  15  32   5  23  55 120
77
##   [55]    2  11  25  18  15  12  18  17  26  75  13  15  70  15  15  17 130
34
##   [73]   30  10  22  55  25  50  50  15  30  20  22  15  15  40 120  80  17
3
##   [91]   60  14  26  25  12  25  30  25  24  27  70  16  45  27  23  25  40
20
##  [109]   21  36  14  51  50  45  51  19  76  20  35  27  35  35  50  38  15
17
```

```
## [127]  25  19  15  18  11  45  12  20  45  18  25  21  49  70   7  19  17
## 38
## [145]  34  30   4  72  18  25   9  21  20  15  18 100  17   7  24  43  30
## 7
## [163]  18  12  25  62  20  70  37  13  40  70  12   9  10  55  18  15  25
## 50
## [181]  10  30  13  40 100  25  68  25  23  15  22   7  16  24  75  11  35
## 60
## [199]  30  25  25  25  12  25  17  11  32  21  25  19  75  52   9  17  35
## 85
## [217]  50  51  18  75  72  35  12  23  16  16  57  50  17  32  21  11  40
## 15
## [235]  17  14  60  55 120  11  39  23  28  37  40   9   8  28  15  17  50
## 48
## [253]  30  68 110  23  12  13  40  30   9  22  30  12  10  25  16  65  22
## 17
## [271]  60  22  35  18  34   6 105 100  20  57  10  17  25  21  45  50  35
## 38
## [289]  16 140  25  18  18  34  65  13  20  29  10  62  50  29  15  15  42
## 130
## [307]  21  51  30  35  31  14  15  60  20  22  80  15 100  30   8  15  80
## 30
## [325]  25  24  35  12  45  25  35  28  17  15  32  15  60  90  11  37  21
## 2
## [343]  70   8  22  40  13  32   5  18  52  31  14   7  12  21  20  26  16
## 15
## [361]  25  20  80  30  16  20  17 100  41  16  25 108  12  38  24  45  98
## 25
## [379]  30  90  27  47  30  25  17  22  18  18  25  27  25  70  65  22  45
## 20
## [397]  65  17  15  15  19  90  10  40  31  30  26  25  11  22  59  23  25
## 18
## [415]  15  30  25  27  25  24  24  20  10   7  42  54  75  15  22  20  65
## 61
## [433]  27  16  35  55  17   8  25  10  26 120   7  18  30  70  20  80  30
## 45
## [451]  25   6  21  11  18  40  20  12  16  10  20  20  25  17  22  20  20
## 30
## [469]  13  15  36   8  10  35  70  35  74  16  70  21 100  70  12  80  25
## 19
## [487]  25  16  60  15  20   9  16  60  15  12  17  25  18  15  45  70  10
## 9
## [505]  12  15  18  12  16  15  30  20  21  10  35  22  33  60  13  21  13
## 39
## [523]  29  35  18 100 130  21  26  50   8  16  16  15  28  23   1  23  21
## 19
## [541]  87  33  15  13  15  25  60  30  18  20  55  60  11  11  40  16  55
## 36
## [559]  16  25  30  19  30  55  80  50  14  10  30  60  24  32  42  35  26
## 30
```

```
##  [577]  31  11  26  18  43  20  35  13  14  81  10  10  20  30  22  20  28
## 80
##  [595]  37  35  12  19  20  22  14  32  80  21  25  21  15  28  18  27  30
## 25
##  [613]  35  12  30  29  70  21  60  25  20  22  12  48  31  27  18   1  40
## 26
##  [631]  80  20  27  20  30  25  22  63  10  10  40  10  40  20  30   6  22
## 22
##  [649]  15  40  45  13  25  11  58  30  23   9  32  35  15  15  21  51  15
## 60
##  [667]  20  51  25  30  11  40   5  35  38  30  25  25  27  25  18  40  40
## 15
##  [685]  20  23  34  16  18  50  45 100  18  23  25  32  30  30  30  18  24
## 70
##  [703]  28  20  35 117  10  70  35  11  27  12  26  76  32  18  23  10  18
## 23
##  [721]  25  32  18  17  52  27   7  70  26  55  20  15  20  20  61   8  15
## 12
##  [739]  40  25 140  12  21  23  20  17  65  80  19  12  11  40  26  30  50
## 44
##  [757]  21  35  22  55  17   1  23  25  14  25  35  20  25  90  13  12  45
## 15
##  [775]  35  17  24  55  16  20  18  32  30  30  19  24  18  25  19  30  32
## 16
##  [793]   2  30  27  10  10  18  30  22  40  65  13   6  40  19  20  45  31
## 30
##  [811]  14  35  10  25  40  45  21  28   4  25  15  61  22  27  19  25   8
## 23
##  [829]  80   7  15  13  30  50  31  30  15  15  50  25  30  60  21  51  18
## 25
##  [847]  50   8  40  16  18  13  35  12  50  29  20   7  21  20  22  31  45
## 25
##  [865]  35  15  22  15  16  26  35  30  23  18 123  16  11  75  60  20  15
## 27
##  [883]   9  60   7  19  15  40  19 130  30  70  24 110 133  22  55  95  25
## 13
##  [901]  12  17  10  70  30  20 107  40  30  90  16  47  30   7  30  20  60
## 30
##  [919]  14  20  27  40  92   7  20  22   8  50  22  14  30  50  15  25  18
## 35
##  [937]  13 100 105  20  15  30  12  50  20   7  42  19  27  14  17  15  13
## 12
##  [955]  26  20  17  20  24  30  16  18  30  52  60  21  33   6  25  15  14
## 105
##  [973]  35  57  20  20  28  60  25  12  69  55  60  20  13 100   2  20  38
## 24
##  [991]  25  15  25  51  35  25  45  21  19  40   9  22  38  50  30  23  21
## 140
## [1009]  60  17  55  17  29  40  17  30  32  40  15  35  32  21  25  33  22
## 15
```

```
## [1027]  32   6  30  14  10  12  15  21  20  20  15  54  21  22  22  17  25
## 22
## [1045]  45  11  17  17  40   5  13  19  19  35  16  15  23  15  19  18  16
## 21
## [1063]  32  13  16  40  50  35  16  35  36  35  55  25  22  17  55  10  23
## 25
## [1081]   5  16  55  24  21  13  22  14  30  18  16  56  31  14  15  82  16
## 16
## [1099]  16  16  50  25  18  25  18  30  65   1  25  20  30  30  18  16  50
## 52
## [1117]  37  25  40  50  15  25  80  13  25  40  15  19  65  18  15  16  23
## 21
## [1135]  10  20  40  31  15  11  55  15  37  42  22  48  15   7  40  12  12
## 65
## [1153]  15  16  22  35  25  20  18  85  25 100  15  18  14  23  40  17  21
## 22
## [1171]  31  11  19  35   9  21   6  20  60  38   9  11  30  22  25  13  30
## 25
## [1189]  25  48   6  14   7  90  25  15 120  14  15  35  30  16   9  23  17
## 43
## [1207]  19  21  17  45  18  43  61  27  15  25  31  50  30  38   5  11  35
## 7
## [1225]  14 120  14  33  19  19  15  18  47  13  25  28  16  31   4  31  30
## 55
## [1243]  30  14  17  21  70  30  15  40   8   7  40  35  16  30  18  30  15
## 12
## [1261]  40  57  60  38  55  24  20  40  38  70  18  25  74  60  60  23  45
## 21
## [1279]  14  13  20  21  25  22   8  25  25  70  11  80  16  18  15  26  20
## 18
## [1297]  18  14  42  58  18  25   9  19  11  15  21  52  40  11  20  33  14
## 28
## [1315]  20  19 100   9  25  15  60  76  16  20  45  35  18  20  26  35  40
## 30
## [1333]  12  19  28  28  22   8  32  45  55   9  23  20  35  23  80  15   9
## 30
## [1351]  20  66  22  16  14  80  25  10  22  12  19  17  25   9   9  33  37
## 24
## [1369]  18  75  25  10  36  26  14  82  30  12  22  16  16  40  20  28  21
## 24
## [1387]  55  31  24  37  30  20  14  20  27  12  80  23  14  10  22  15  27
## 20
## [1405]  31  14  40  25  35  20  42  25  50  20  13   6  16  60  23  15  14
## 9
## [1423]  16  42  40  25  25  37  23  30  12  35  47  28  63   8  35  60  30
## 22
## [1441]  13  42  45  25  10  35  37  35  40  17  12  15  30  60  19  27  10
## 12
## [1459]  70  44  45  17  80  16  24   8  51  70  60  45   1  27  35  72  45
## 20
```

```
## [1477]  30  30  13 120  15  61  15  30  18  28   8  22  40  15  20  15  23
## 20
## [1495]  17  21  52  30  22  19  18  47  15  15  21  40  17  14  23  68  25
## 50
## [1513] 140  28   7  23   7  10  15  11  12  28  80  25  28  15  30  15  22
## 28
## [1531]  16  95  27  56  50  21  21  40  18  55  90  28  55  21   9  35  13
## 55
## [1549]  51  34   5  60  45  38  48  35  32  25  60  12  19  40  50  55  28
## 18
## [1567]  21  37  11  20  30  15  55  17  17  25  22  35  20  20  39  33  18
## 40
## [1585]  24  35  40  11  26  18  15  25  21  18  55  15  18  20  15  20  70
## 13
## [1603]  55  55  24  50  30  10  18  18  45  15  16  45  18  60  24  35  15
## 21
## [1621]  25  15  11 100  52  24  14  55  45  25  25  32  41  40  32  12   7
## 30
## [1639]  22  30  17  21  15  22  15   9  49  57  20  27  30  30   5  22  55
## 45
## [1657]  25  25   5  55  15  15  24  10  14  25  10  20  80  20  15  10  40
## 15
## [1675]  17  11  15  17  19  26  22   8 120  24  23  90  61  17  40   1  34
## 10
## [1693]  27  30  50  25  63  17  18  20  45  25  70   3  26  32  60  18  70
## 35
## [1711]   8  65  70  45  35  28  75  20  15  15  18  30  10  15  35  35  13
## 15
## [1729]  19  25  23  47  17  14  47   8  12  38  16  90  17  70  18  21  32
## 30
## [1747]  50  14  19  11  18  19  20  28  15  65  19  15  23  16  30  60  15
## 22
## [1765]  30  18  20  45  17  20  21  25   6  14  20  15  17  10  25  30   8
## 18
## [1783]  18  21  15  78  20  18  18  52  20  25  12  15   6  18  35  21  60
## 97
## [1801]  45  35  13  17  14  25  17  21  35   8  13  38  88  18  40  20   7
## 27
## [1819]  60  28  38  45  21  42  19  60  43   6  40  50  14  45  20  28  12
## 20
## [1837]  42  14   2  35  11   5  20  29  24  18  10  30  15  15  60  26  40
## 40
## [1855]  25  27  22  23  12  30   2  40  30  60   9  70  17  45  51  10  85
## 30
## [1873]  14  15  10  27  15  35  20  90  10 100  55  35  18  21  15  74  50
## 70
## [1891]  24  28  15  38  16  35  19  52  10  39  30   8  19  11  22  23  14
## 25
## [1909]  55  40  35  17  35  15  15  80  40  42  14  26  42  25  70  40  60
## 25
```

```
## [1927]    5   30   45   11   22   25   14   19   20   12   16   60   46   53    6   18    5
## 25
## [1945]   35   10   60   16   12   31   51   50   25   15   33   80   25    9   27   15    8
## 70
## [1963]   35   18   20   48   18   35   42   15   15   45   36   40   40   50   15   16   14
## 10
## [1981]   15   18   24   50   50   20   25   25   25   30   52   62   80   17   36   23   53
## 10
## [1999]   24   65   15   40   12   20   21   17   56   80   16   30   45   20   20   22   50
## 16
## [2017]   35   31   29   10   55    8   40   15   70   25   35   69   85   20   18   28   50
## 12
## [2035]   44   42   17   63   80   90   34   18   35   40   20  110   10   23   20   13   25
## 36
## [2053]   25    3    3   83   12   14   80   15   15   25   15   15   17   15   21   17   80
## 45
## [2071]   17   20   34   25   60   25   20   24   30   15   17   16   20   42   25   75   36
## 12
## [2089]    4   35   34   22   35   30   81   40   30   60   13   15   15   20   40   15   30
## 25
## [2107]   65   78   14    5   13   15   15    7   14   13   22   14   25   10   11   14   13
## 10
## [2125]    6   21   40   16    5   18   14   42   32   28   28   60   35   85   12   20   27
## 36
## [2143]   33   23   13    4   25   80   55   45   11   37   30   18   16   15   42   75   15
## 35
## [2161]   28   15   24   23   61   75   10   21   12   22   32   28   70   65   16   10  110
## 25
## [2179]   24    8   25    9   14   40   10   40   10    8   38   18   12   30   23   70   15
## 36
## [2197]   26   25   25   15    6   14   19    8   17   35   70   15   50   14   21   30   30
## 20
## [2215]   34   14   25   18  101   20   35   20   16   75   70   29   84   22   90   20   45
## 22
## [2233]   37   50   22   25   10   40   32   60  100   55   60   11   70   20   55   19   17
## 90
## [2251]   35   17   35   27   26   23   19   35   50   12   11   15   39   60   11   90   27
## 14
## [2269]   25   19   50   60   11   90   65   11   30   30   95   50   12   55   28  100   22
## 20
## [2287]   35   20    4   12   17   20   25   40   25   15   50   30   30   24   75   19   15
## 55
## [2305]   92   12   14   40   14   35   25   17   60   22   30   12   55   16   60   18   30
## 15
## [2323]   45   13   40   30   20   20   12   12   11   22   22   12   55   20    4   50   25
## 130
## [2341]   75   11   33   32   24   35   21   21   25   24   19   22   60   12   16   85   12
## 60
## [2359]   17   83   20   20   35   50   10   39   18   76   25    9    9    4   33    9   15
## 23
```

```
## [2377]  12  18  70  16  97  35  17   2  20   8  19  15  27  18  25  23  17
## 11
## [2395]  24  25  20  12  12  35  60  22  30  15  22  23  35  18  30  25  12
## 18
## [2413]  75  15  24  15  60  45  13  45  21  11  30  29  14  60  68  30   7
## 16
## [2431]   6  20  10  17  30   1  18  12  16   7   2  21 115  24  15  40  24
## 29
## [2449]  55   6  20  12  30  30  24  70  30  31  10  15  15  12  40  34  20
## 30
## [2467]   9  35  13  21  12  51  31  60  25  28  10  30  23  11 100  28  45
## 10
## [2485]  73  11  30  12  17  38  28  15  17  46  25  25  15  20  15  40  40
## 25
## [2503]  85  33  16  25 120  60  17  16  30  13  15  18  20  24  56  25  28
## 45
## [2521]  29  15  45  13  21  45  19  45  27  23  30  40  80  40  15  25  12
## 20
## [2539]  37  21  17  37  19   8  17  35  40  11  47  21  18  22  20  55  25
## 11
## [2557]  12  14  42   9  25  35  40  90  20  45  30  35  62  12   8  56  15
## 29
## [2575]  66  11  50  35  45  65  50  17  38  20  42  60   5  35  24  12  29
## 7
## [2593]  35  15  85  12  35  22  25  35  80  15  30  39  40  60  32  28  15
## 25
## [2611]  40  13  74  35  18  25  38  22  20   7  13  15  33  80   6  30  22
## 34
## [2629]  27  10  60  34  28  13  17  15  20  18  75  26  70  52  14  25  50
## 17
## [2647]  25  22  18  20  68   5  20  55  15  25  35  15  21  15  35  65  25
## 65
## [2665]  40  14  12  35  14  75  90  16 120  15  55  35  21  40  19  18  30
## 21
## [2683]  60  17  77  20  35  12  25  16  10  15  24  34 125  45  57  75  60
## 20
## [2701]  90  14   4  60  21  27  50  25  17  60  19  50  40  10  30  60  70
## 52
## [2719]  15  17  13  20  28  15   9  30  11  15   5  20  15  25  23  18  30
## 25
## [2737]  38  60  37 100  35  18  15  35  85  15  26  35  80  15  25  20  20
## 32
## [2755]  40  35  25  24  26 104  51  30  35  25  16  16  25 100  60  52  23
## 16
## [2773]  25  30  17  19  10  18  10  10  12  18  60  45  10  25  22  17  15
## 30
## [2791]  37  55  65  75  14  11  52  27  49  46  22  40  25  50  50  30  13
## 21
## [2809]  40   7  25  51  26  20   8  40  10  17   2  63  70  45  21  14  13
## 13
```

```
## [2827]  12  19  20  27 100  16  12  35   4  40  17  32  12  27   8  22  52
## 9
## [2845]  18  15  13  20  16  16  25   3  32  40  10  35  35  23  47  60  70
## 50
## [2863]  48  17  25  25  25  63  12  14  12  14  83  28  35   5  14  25  25
## 12
## [2881]  22  60  80  32  15  63  17  62  16  25  20  11  14  50  18  51  12
## 7
## [2899]  70  27  19  37  20  25  23  11  80  23  50  90  80   5  20  46  25
## 15
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## 60
## [2935]  11  18  18  16  25  75  12  25  60   4   9  25  20  60  42  40  13
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## [2971]  15  23  30  24  35   5  46  50  38  36   4  25  15  25  30  35  18
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## [3007]  44  17  57  30  15  80  26  25  80  30  20  13  12  90  45  50  27
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## [3025]  15  12  60  11  18  10  21  22  28  65  24  33  50  51   5  40  24
## 25
## [3043]  21   9  10  43  13  10   8  45  14  25  45  18  21  25  20  30  35
## 44
## [3061]  47  20  55   6  13  12  25  35  50  17  33  20  13  59  42   3  16
## 60
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## [3151]  25  35  15  45  24  15  16  24  11   7  60  27  40  16   9  32  35
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## [3169]  10  22  35  18  35  15  27  14  15  27  32  25  16  26  20  70  24
## 21
## [3187]  30  22  11  18  90  16  45  24  30  32  42  24  24  90  40  22  27
## 16
## [3205]  72  15  40  28   8  12  15  55  16  14  21  18  18  63  48  20 101
## 28
## [3223]  40  15  11  21   7  35  22  18  34 100  30  18  29  45  18  60   6
## 30
## [3241]  20  50  17  30  25  48  70  55  13  45   9  25  47  80  25   9   7
## 80
## [3259]   9  53  30  12  10  20  40  42  17  21  18  35  18  17  30  39  18
## 45
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## 54
## [3583]  85  20  46  21  33  33  29  20  65 120  30  16  90  25  32  29  12
## 32
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## 100
## [3709]  50  18  13  30  50  33  44  45  30  23  13  18  28  50  11  15  25
## 27
```

```
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     25
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     16
## [3799]    30   27   22   15   11   17   44   54    8    9   25   25   15   25   55   41   15
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## [3817]    25   25   32   30   14   58   30   12   24   47   18   55   25   53   23   22   12
     32
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     30
## [3853]    15   40   10   34   70   27   21   15   15   46    4    5   40   19   33   11   34
     16
## [3871]    21   80   55    9   21   25   18   41   23   15   13   35   33   11   35   30   25
     27
## [3889]    96   40   11   20   50   75   24   32   16   27   15   19   20   35   80   40   18
     12
## [3907]    25   19   60   79   95   30   50   22   33   15   11   30    8   25   30   15   30
     70
## [3925]     7   80    6   30   21   17  120   27   22   35    6   15   20   11   30   20   30
     20
## [3943]    40   30   15   60   17   35   34   35   25   18    8   24   13   30   27   15   27
     22
## [3961]    50   22   25   21   12  140   30   60   35   12   12   21   70   20   67   24   62
     11
## [3979]    17   32   65   58   52   30   12   20   30    7   37   30   47   90   38   20    2
     25
## [3997]    19   19   18   30   45   45   15   19   24   40   35   21   18  100   23   25   80
     15
## [4015]    68   40   50   28   10    9   46   22   44   30
```

```
var(x)
```

```
## [1] 446.0416
```

H0:var_Tumor size=450 H1:var_Tumor Size!=450

```
varTest(x,alternative = "two.sided",sigma.squared = 450,conf.level = 0.95)
```

```
## $statistic
## Chi-Squared
##     3987.612
##
## $parameters
##    df
## 4023
##
## $p.value
```

```
## [1] 0.6978332
##
## $estimate
## variance
## 446.0416
##
## $null.value
## variance
##      450
##
## $alternative
## [1] "two.sided"
##
## $method
## [1] "Chi-Squared Test on Variance"
##
## $data.name
## [1] "x"
##
## $conf.int
##      LCL      UCL
## 427.1735 466.1942
## attr(,"conf.level")
## [1] 0.95
##
## attr(,"class")
## [1] "htestEnvStats"
```

Conclusion:Here P value is 0.6978332 which is greater than alpha=0.05,so here we accept the null hypothesis.

Question 2: Test for equality of variance

 # subset 1

```
White<-subset(Breast_Cancer,Race=='White')

#subset 2

Black<-subset(Breast_Cancer,Race=='Black')

y<-Breast_Cancer$Race
y

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## [4015] "White" "White" "White" "White" "White" "Other" "White" "White"
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## [4024] "White"

var(White$`Tumor Size`)

## [1] 447.1265

var(Black$`Tumor Size`)

## [1] 491.3952
```

v1=tumor size of White(race) v2=tumor size of Black(race)

H0:v1=v2 H1:v1!=v2

```
var.test(White$`Tumor Size`,Black$`Tumor Size`,alternative =
'two.sided',conf.level = 0.95)

##
##  F test to compare two variances
##
## data:  White$`Tumor Size` and Black$`Tumor Size`
## F = 0.90991, num df = 3412, denom df = 290, p-value = 0.2585
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
##  0.7630909 1.0717090
## sample estimates:
## ratio of variances
##           0.9099123
```

Conclusion: Here p value is less than alpha.so we reject the null hypothesis.Therefore tumor size of White(race) is not equal to tumor size of Black(race).